

ARTIFICIAL INTELLIGENCE THEORY

1	Course Title:	ARTIFICIAL INTELLIGENCE THEORY	
2	Course Code:	BM5116	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	2	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Dr. Öğr. Üyesi CEYDA NUR ÖZTÜRK	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	ceydanur@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	To explain the representations, techniques, methods, and tools for making computer systems equipped with the abilities of problem solving, inference, learning, decision making, and planning in various environments.	
19	Contribution of the Course to Professional Development:	Engineering Science: 70%, Engineering Design: 30%	
20	Learning Outcomes:		
		1	Being able to solve problems using uninformed, informed, local, or adversarial search methods
		2	Being able to satisfy initially described certain constraints during a search
		3	Being able to program logical inference problems using declarative languages
		4	Being able to select appropriate learning methods for classification, regression, or clustering problems
		5	Being able to adapt probabilistic reasoning approaches to real world problems
		6	Having knowledge about fundamentals of deep learning
		7	Being able to design and implement intelligent systems that can work in different environments
		8	
		9	
		10	
21	Course Content:		
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Week	Theoretical	Practice	
1	Introduction, intelligent agents		
2	Problem solving by searching, uninformed search algorithms		

3	Informed search algorithms, local search algorithms	
4	Games and adversarial search	
5	Constraint satisfaction problems	
6	Logical inference: Propositional logic, first-order logic	
7	Prolog programming	
8	Planning, forward and backward searches, planning in real world	
9	Probabilistic reasoning: uncertainty, Bayes' rule, Bayesian networks	
10	Temporal probabilistic reasoning: hidden Markov models, forward algorithm, Viterbi algorithm, forward and backward algorithm	
11	Learning from observations: linear and logistic regressions, decision trees, design and analysis of learning systems	
12	Statistical learning: Bayesian learning, naive Bayes, nearest neighbour models, artificial neural networks, backpropagation algorithm	
13	Deep learning	
14	Decision making: Markov decision processes, value iteration, reinforcement learning	
22	Textbooks, References and/or Other Materials:	<p>1. Russell, S., and Norvig, P., 2016. Artificial Intelligence: A Modern Approach, 3rd Edition, Pearson Education, ISBN-10: 0136042597 ISBN-13: 978-1292153964.</p> <p>2. Zhang, A., Lipton, Z. C., Li, M., and Smola, A. J., 2022. Dive into deep learning. arXiv preprint DOI: https://doi.org/10.48550/arXiv.2106.11342.</p> <p>3. Ekman, M., 2021. Learning Deep Learning: Theory and Practice of Neural Networks, Computer Vision, NLP, and Transformers Using TensorFlow, Addison-Wesley Professional, ISBN-10: 0137470355 ISBN-13: 978-0137470358.</p>
23	Assesment	
TERM LEARNING ACTIVITIES		NUMBE R
Midterm Exam		0
Quiz		0
Home work-project		3
Final Exam		1
Total		4
Contribution of Term (Year) Learning Activities to Success Grade		60.00
Contribution of Final Exam to Success Grade		40.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		Programming assignments, article review, presentation, written exam
24	ECTS / WORK LOAD TABLE	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	3.00	42.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	96.00	96.00
Total Work Load			180.00
Total work load/ 30 hr			6.00
ECTS Credit of the Course			6.00

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	5	4	4	2	3	0	0	0	0	0	0	0	0	0	0
ÖK2	5	5	3	3	2	2	0	0	0	0	0	0	0	0	0	0
ÖK3	5	5	4	4	2	4	0	0	0	0	0	0	0	0	0	0
ÖK4	4	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0
ÖK5	5	5	4	4	2	3	0	0	0	0	0	0	0	0	0	0
ÖK6	4	3	3	1	3	1	0	0	0	0	0	0	0	0	0	0
ÖK7	5	5	5	5	1	3	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low		2 low			3 Medium			4 High			5 Very High				